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(54) **Identifying and controlling the movement of containers**

(57) A method of identifying and controlling the movement of comprises allocating a unique identification to a container and applying this identification to the container, providing means for recognising this identification and transmitting the identification to an information processing and storage arrangement, entering and storing in said arrangement the size and tare of the container and the eventual destination for this and other containers, filling the container, weighing the container, transmitting said weight and the content type to the information processing and storage arrangement and producing from said information processing and storage arrangement a temporary identification for the container, to allocate the container to a particular destination.

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**SPECIFICATION****Improvements in or relating to container handling systems**

5      The present invention concerns improvements in or relating to methods of and apparatus for handling containers, particularly but not exclusively beer containers and containers of pressurised gas for use  
 10     in dispensing beer.  
 Beer is dispatched from a brewery to retail outlets in metal containers of varying sizes. In the brewery warehouse the containers are filled with a pre-determined volume from a bulk supply and contain-  
 15     ers each containing approximately the same volume are stored together. To ensure that each container contains a minimum quantity of beer they are often filled beyond this minimum quantity. When a load of beer is to be dispatched to various retail outlets a  
 20     lorry is loaded in accordance with instructions issued for example by the order department of the brewery and the loaders select from the various stores of containers the containers appropriate to the orders placed by the retail outlets to be delivered  
 25     from that lorry.

As a result the warehousing system is to a certain extent random and close control cannot be kept on the whereabouts of the containers, their age, the quantity and type of beer therein etc. without  
 30     laborious and consequently expensive manual stock control methods.

It is an object of the present invention to obviate or mitigate these disadvantages.

The present invention comprises a method of  
 35     handling containers comprising allocating a unique identification to a container and applying this identification to the container, providing means for recognising this identification and transmitting the identification to an information processing and storage arrangement, entering and storing in said arrangement the size and tare of the container and the eventual destination for this and other containers, filling the container, weighing the container, transmitting said weight and content type to the information processing and storage arrangement and producing from said information processing and storage arrangement a temporary identification for the container, to allocate the container to a particular destination.

50      Preferably when a plurality of containers which may contain different contents and/or quantities have been handled such that a pre-determined batch of containers for a particular destination is completed the information processing and storage arrangement produces a list relating to said batch. Said list may be printed on paper and/or may be transmitted electronically to a portable information processing and storage arrangement such that the batch may be checked against the list during a later  
 55     operation.

Both the fixed and portable information processing and storage arrangements may be computers and as well as being capable of being electronically linked with each other may be linked with further  
 60     computers used for example to determine the

make-up of each batch. Preferably the fixed and portable information processing and storage facilities are each provided with manual input systems.

Preferably the identification on a container is a bar code permanently attached thereto and the fixed and portable information processing and storage facilities are provided with bar code reading devices.

The present invention provides also apparatus for carrying out the method described in any one of the preceding four paragraphs.

Further according to the present invention there is provided a method of applying labels to metal containers comprising treating the container over a specified area to clean said area and reduce the

80     thickness of the metal over said area by at least the thickness of the label to be applied and fixing the label within said area such that its upper surface in use is level with or below the surface of the container.

85     The container may be treated by shot blasting or by chemicals.

The label may be metallic, may be attached by a suitable adhesive and may together with a surrounding region of the container be coated with a lacquer.

90     It is preferable that the adhesive and lacquer are resistant to the chemical, thermal and mechanical shock to which the container may be subjected in use.

An embodiment of the present invention will now  
 95     be described by way of example only.

A beer container for use in this embodiment is a metal cask and has a bar code carried on a metallic label permanently attached to it. The bar code is unique to the container and is applied to it after the

100     container has been shot-blasted or chemically treated over a defined area, for example a rectangle, to provide a rebate and a clean surface to which the bar code label is attached by means of a suitable adhesive. A lacquer coating is applied over the bar

105     code label and the adjoining areas of the container with which its top surface is flush. It should be realised that in view of the arduous operating conditions to which the container is subjected, for example mechanical shocks due to transportation,

110     thermal shocks are chemical attacks arising mainly from the cleaning and sterilising operation the metal label, adhesive and lacquer must be carefully selected to ensure permanent attachment of the label.

115     The container's bar code and its tare are entered and stored in a computer memory. The size of the container may also be entered.

Beer is transferred from a bulk container after brewing to the container described above and with  
 120     certain beers the filled container is left for some time to allow the beer to condition. When the beer is ready for distribution the container is placed on a weighing mechanism provided with a micro-computer and a digital converter which ensures that the weight taken by the mechanism is transmitted to the micro-computer. On the weighing mechanism a light pen is used to read the container's bar code identification, this being noted by the micro-computer. In certain instances additional products, for example finings are added to the container. The

125     130

total weight of the container and its contents is transmitted to the micro-computer and stored. From information passed from the main brewery computer to the micro-computer an identification label is 5 made up for the loaded container by a printer linked to the micro-computer, the label indicating, for example, the container weight, the type of beer therein and also a destination, this typically comprising a number allocated to a delivery lorry and a 10 number allocated to a retail outlet to which the container is destined. The container with the temporary label attached is then removed from the weighing apparatus and put in the storage position allocated for the particular lorry to which it has been 15 consigned. Generally the operation continues with other containers of a similar size and containing the same beer. At this stage containers containing another beer and/or containers of a different size may be substituted and the operation carried out as 20 before. If the required number of containers is passed through the weighing mechanism before the supply is exhausted this fact is communicated to the operator of the weighing mechanism by the micro-computer which indicates a change in product 25 and/or container size is called for. This can be put into effect by manual, mechanical or electronic means.

When a batch of containers for a particular retail outlet has been completed the printer associated 30 with the micro-computer prints a list of the contents of the batch for the particular retail outlet. This confirms to the loaders that this particular batch has been completed.

Information collected on the micro-computer at 35 the weighing mechanism is transmitted back to the main computer.

After the lorry has been loaded a portable computer arrangement including bar code reading means is linked with either the main or micro-computer and 40 from their memory the memory of the portable computer is supplied with details of all the batches of the lorry load and the retail outlets to which the load has to be delivered.

On arrival at a retail outlet, prior to unloading the 45 lorry, the lorry crew identify the retail outlet to the portable computer by reading a bar code permanently fixed at some convenient place on the retail outlet. The portable computer is then used to identify each container by reading its bar code as it is 50 transferred from the lorry to the retail outlet and if the identification of the container does not match with one in the batch stored in the memory then the portable computer signals that this container is not meant for this outlet. The portable computer may 55 also signal when the batch to be delivered has been completely unloaded. The fact that all the containers have been unloaded is stored in the computer and this can be transferred to the main computer after the lorry returns to base so that it can institute 60 subsequent procedures. If the lorry takes empty containers away from the retail outlet then the portable computer can identify and store the details of these containers and this can also be transferred to the main computer on return to base.

65 It will be realised that similar facilities can be

utilised to record and store information relating to filled containers stored in conditioning warehouses, at repair etc. Thus, at any one time the memory system of the computer can identify a container's

70 whereabouts, its content type, its time of filling, its weight etc. If the container is removed for repair then this is noted by the computer which will not accept the container at the weighing mechanism unless it has been advised that the container's tare has been 75 checked and, if necessary, altered in the computer memory.

It will be realised that various safeguards are built into the system, for example the bar codes are provided with a check digit suffix such that any

80 manual entries can be validated. As indicated above, the portable computers have manual inputs thereto for use in the event of a failure of the bar code reader and manual inputs are also provided on the weighing mechanism and micro-computer such that

85 it may operate independently of any computing device and in the event of a break-down of associated items of equipment, for example the interface between the mechanism and the micro-computer.

It is a known feature of brewery operations that

90 orders for outlets are required considerably in advance of the date on which they are delivered in order that the load may be allocated and withdrawn from stock for delivery on the due date. It is also a known occurrence for outlets to require additions,

95 deletions or variations to their previously given order. Using existing systems this requires a manual or "emergency" routine to enable such changes to be incorporated before the vehicle leaves the premises. With the present embodiment a terminal or other

100 device may be directly attached to the micro-computer resident within the warehouse or any other such computer which accesses it, in order to incorporate such emergency additions, deletions or variations for normal orders. This will operate

105 without manual input up to the point at which that load has been completely filled and a separate routine of manual or electronic means will exist for the incorporation of late information beyond this point. In practice, this means that variations to

110 orders may be accepted at very short notice without disruption. Another feature of this system is that a method exists of processing orders in the event of a failure of other associated computer systems in that a direct link into the order allocation and documentation can be made without recourse to other external systems interfacing with it.

Numerous modifications can be employed without departing from the scope of the present invention. It will be readily apparent that several weighing

120 mechanisms can be employed, controlled by their individual micro-computers and, in unison, by the main computer. Within each weighing mechanism there may be a system for storing data on magnetic media such that in the event of a failure of power

125 supply, a failure of the transmission line between the weighing mechanism and any other computing system to which it is attached, or failure of any of the components of the system, there is a means of securing this data for later transmission to computing systems. The means of identifying each contain-

er may be modified, for example rather than employing bar codes each container may be identified by use of an optical character reading system, a magnetic encoding system, a laser optical character

5 reading system or any other passive system which transmits unique data when subject to interrogation by electromagnetic radiation.

It is an important feature that at least two labels should be affixed to each container or cylinder, one 10 of which should appear in a prominent position for ease of reading by manual or mechanical means, the other of which should be in a protected position in the event of damage occurring to the other label.

In production of labels for affixing to containers, 15 additional labels are maintained to replace any that may be damaged in use.

Whilst endeavouring in the foregoing specification to draw attention to those features of the invention believed to be of particular importance it should be 20 understood that the Applicant claims protection in respect of any patentable feature or combination of features hereinbefore referred to whether or not particular emphasis has been placed thereon.

## 25 CLAIMS (filed on 31.12.82)

1. A method of handling containers comprising allocating a unique identification to a container and applying this identification to the container, providing 30 means for recognising this identification and transmitting the identification to an information processing and storage arrangement, entering and storing in said arrangement the size and tare of the container and the eventual destination for this and 35 other containers, filling the container, weighing the container, transmitting said weight and content type to the information processing and storage arrangement and producing from said information processing and storage arrangement a temporary identification for the container, to allocate the container to a 40 particular destination.

2. A method as claimed in claim 1, in which when a plurality of containers which may contain different contents and/or quantities have been handled such 45 that a pre-determined batch of containers for a particular destination is completed the information processing and storage arrangement products a list relating to said batch.

3. A method as claimed in claim 2, in which said 50 list is printed on paper.

4. A method as claimed in claim 2 or claim 3, in which said list is transmitted electronically to a portable information processing and storage arrangement such that the batch may be checked 55 against the list during a later operation.

5. A method as claimed in any one of the preceding claims, in which the fixed and portable information processing and storage arrangements are computers and as well as being capable of being 60 electronically linked with each other are adapted for linking with further computers.

6. A method as claimed in any one of claims 1 to 4, in which the fixed information processing and storage facilities are each provided with manual 65 input systems.

7. A method as claimed in any one of claims 4 to 6, in which the portable information processing and storage facilities are each provided with manual input systems.

70 8. A method as claimed in any one of the preceding claims, in which the identification on a container is a bar code permanently attached thereto.

9. A method as claimed in claim 8, in which the 75 fixed and portable information processing and storage facilities are provided with bar code reading devices.

10. Apparatus for carrying out the method claimed in any one of the preceding claims.

80 11. A method of applying labels to metal containers comprising treating the container over a specified area to clean said area, reducing the thickness of the metal over said area by at least the thickness of the label to be applied and fixing the label with said 85 area such that its upper surface in use is level with or below the surface of the container.

12. A method of applying labels to metal containers as claimed in claim 11, in which the thickness of the metal over said area is reduced by stamping.

90 13. A method of applying labels to metal containers as claimed in claims 11 or 12, in which the container is treated by shot blasting or by chemicals..

14. A method of applying labels to metal containers as claimed in any one of claims 11 to 13, in which the label is metallic.

15. A method of applying labels to metal containers as claimed in claims 11 to 14, in which the label is attached by a suitable adhesive.

100 16. A method of applying labels to metal containers as claimed in claims 11 to 15, in which the label together with a surrounding region of the container is coated with a lacquer.

17. A method of applying labels to metal containers as claimed in claim 16, in which the adhesive and lacquer are resistant to the chemical, thermal and mechanical shock to which the container may be subjected in use.

18. A method of handling containers as claimed 110 in claim 1 and substantially as hereinbefore described.

19. Apparatus as claimed in claim 10, substantially as hereinbefore described.

20. A method of applying labels to metal containers as claimed in claim 11 and substantially as hereinbefore described.

21. Any novel subject matter or combination including novel subject matter herein disclosed, whether or not within the scope of or relating to the 120 same invention as any of the preceding claims.